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Obituary.

MAJOR-GENERAL SIR DAVID BRUCE, K.C.B., LL.D., D.Sc., F.R.C.P., F.R.S.

BY the death of Sir David Bruce the country has lost one of its foremost research workers in tropical diseases, and the Corps an officer whose distinguished scientific attainments will serve as an incentive to the younger generation for many years to come.

Bruce will always be included in the small group of men containing the honoured names of Sir Patrick Manson, Sir Ronald Ross and Sir William Leishman, who laid the foundations of modern tropical medicine.

Bruce was born in 1855 at Melbourne in Australia, but at the age of 5 he was sent to Stirling in Scotland and was educated at the High School there. When 14 years old he went to Manchester and worked in the warehouse of Messrs. Phillips and Co., where he remained for three years and devoted his leisure time to boxing and football. In 1876 he returned to Scotland and entered the University of Edinburgh. He was a medallist in Natural History and Comparative Zoology and took the degrees of M.B., C.M. He was the first man of his year, receiving the Eccles Scholarship. While working in Edinburgh he developed a taste for ornithology and spent some years searching the Grampians for rare birds.

Bruce had a fine physique and great independence of character. His dogged determination to succeed was perhaps the result of his Australian birth and Scottish upbringing. He left nothing to chance. We can visualize him preparing for one of his expeditions, wearing his white coat in the laboratory and surrounded by books of reference on the subject to

be investigated, Lady Bruce working with him and making those wonderful drawings which did so much to enhance his work. He would take some time planning his scheme of work, but that completed off he went and nothing would turn him until the work was brought to a successful conclusion. Difficulties only spurred him on to fresh exertions.

Bruce died full of honours and had the satisfaction of knowing that most of the work to which he had set his hand had been of untold benefit not only to the soldiers he loved so well, but to mankind in general.

It was truly tragic that the last years of a most useful life should have been clouded by the illness and death of Lady Bruce, his faithful companion in his travels and his assistant in all his scientific work.

Bruce joined the Army as a Surgeon in 1883; other distinguished officers in his batch being Sir William Macpherson and Sir Robert Firth.

In 1884 he proceeded to Malta and while there began the scientific investigations which brought him world-wide fame. He conducted an inquiry into an outbreak of cholera in Malta and was thanked by the Civil Government and the Director-General, Army Medical Services for his work.

He studied the prevalent fevers in Malta and succeeded in showing that Malta or Mediterranean fever was caused by a special microbe which he called the *Micrococcus melitensis*.

In 1889 Bruce was appointed Assistant Professor of Pathology at the Army Medical School, Netley, and remained there for five years. He studied bacteriology under Professor Koch in Berlin, and then initiated the first course in bacteriology ever held in a medical school in England.

In 1894 Bruce went to South Africa, and in 1898 he was asked by the Natal Government to investigate "nagana" and tsetse fly disease in Zululand, which at that time were thought to be distinct diseases. After two months' research he proved that a trypanosome was responsible for both nagana and tsetse-fly disease, and that the trypanosome, now known as the *Trypanosoma brucei*, was carried from one animal to another by the fly *Glossina morsitans*. He was thus the first to prove that an insect may carry a protozoon of a pathological kind. He studied nagana in a large number of domestic animals, and also found *T. brucei* in the wild animals in South Africa. His investigations were much appreciated by the Secretary of State for the Colonies. The work also obtained immediate recognition in scientific circles. Bruce was made a Fellow of the Royal Society, and received the Cameron Prize of the University of Edinburgh.

Bruce was in South Africa when war broke out. He was present at the Siege of Ladysmith and for his services in the war was specially promoted to the rank of Lieutenant-Colonel and received the medal with seven clasps. He was appointed a member of the Committee which investigated the prevalence of dysentery and typhoid fever during the South African War. The Report of the Committee was presented to Parliament.

In 1902 Bruce was made a member of the newly constituted Army Medical Advisory Board, and served on the Board until 1910.

In 1903 he was promoted to the rank of Brevet Colonel, the first brevet given for scientific services.

In 1903 Bruce went to Uganda on an expedition sent by the Royal Society to investigate sleeping sickness. Working in conjunction with Castellani he showed that the disease was caused by the *Trypanosoma gambiense* and that this was conveyed from the sick to the healthy by the fly *Glossina palpalis*. In 1908 he again went to Uganda as Director of the Royal Society's Commission on Sleeping Sickness.

In 1904 he was appointed Chairman of the Royal Society's Committee in London which sent a commission to Malta to investigate Mediterranean Fever. As a result of the labours of the Commission it was shown that Mediterranean fever was mainly disseminated through the agency of milk from goats infected with the *M. melitensis*. When the use of goats' milk was discontinued in the Services, Mediterranean fever practically disappeared from among the naval and military forces in Malta.

In 1904 Bruce was appointed editor of the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, a post which he held until 1908.

In 1911 he went to Nyasaland as Director of the Royal Society's Commission to investigate the connection, if any, between the wild animals and human and stock diseases.

The Commission found that the common tsetse fly in Nyasaland was *Glossina morsitans*, and that the polymorphic trypanosome, *T. brucei*, was present in wild flies. All the big game were infected with this fly, but not in sufficiently large numbers to affect their health. In the blood of cases of sleeping sickness a trypanosome was found which could not be distinguished from the polymorphic trypanosome in the local fly. Both trypanosomes had the same forms and were identical in their action on experimental animals. They resembled *T. rhodesiense*, but were easily distinguished from *T. gambiense*, the cause of sleeping sickness in Uganda.

The Commission found that they could infect antelopes with the human strain, but had to leave unsettled the problem whether the animal strains could infect man. Later, Dr. Taute, a German investigator, showed that the trypanosomes in animals were not infective for man. He fed infected flies on himself, two assistants, and on more than a hundred natives; none of them became infected. Recently Dye, in Nyasaland, has shown on epidemiological grounds that human cases of sleeping sickness are probably infected from other human cases. The human strain seems to lose its power of infecting man when passed through animals, and consequently game may act as a buffer to man.

In 1912 Bruce was specially promoted Surgeon-General for his scientific services.

In 1914 he was appointed Commandant of the Royal Army Medical College and remained there until 1919. During the War he was Chairman

of the War Office Pathological Committee and of the Committees for the study of Tetanus and Trench Fever. He was placed on retired pay in 1919.

In 1923 he received a Good Service Reward, and in 1924 he was appointed Colonel-Commandant of the Royal Army Medical Corps.

Bruce was the recipient of many honours. He was appointed a C.B. (civil) in 1905, and was made a Knight Bachelor in 1908, and K.C.B. in 1918. He received a Royal Medal from the Royal Society in 1904; the Mary Kingsley Medal in 1905; the Stewart Prize of the British Medical Association in 1908; the Leeuenhoek Medal from the Dutch Academy of Science in 1915; the Buchanan Medal of the Royal Society in 1922; the Manson Medal of the Royal Society of Tropical Medicine and Hygiene in 1923; the Albert Medal of the Royal Society of Arts in 1923.

He was made an F.R.C.P. London in 1906, and was Croonian Lecturer in 1915. The honorary degree of D.Sc. was conferred on him by the Universities of Dublin and Toronto, and the LL.D. by the Universities of Glasgow and Liverpool. He was made an Honorary Fellow of the Royal Society of Edinburgh; Correspondent, Académie des Sciences, Institut de France; Foreign Correspondent, Académie de Médecine, Paris; Membre honoraire, Société de Biologie; Membre honoraire de la Société de Pathologie exotique; a Corresponding Member of the Royal Philosophical Society, Glasgow. He was elected a member of the Athenæum Club under the special clause for scientific services.

He served on the Council and on many committees of the Royal Society.

In 1916 Bruce was made Chairman of the Governing Body of the Lister Institute and retained the position until his death.

In 1924 Bruce was selected for the post of President of the British Association Meeting held at Toronto, a crowning honour of a life devoted to science. He delivered the Presidential Address, taking as his subject "The Prevention of Disease."

Bruce was singularly fortunate in his married life. In 1883, just after he had joined the Army, he married Mary Elizabeth Steele, daughter of the late Dr. Steele, of Reigate.

Lady Bruce always accompanied her husband on his foreign tours and on his various expeditions to tropical Africa. She was present in Ladysmith during the siege and for her work, other than nursing, received the Royal Red Cross. During the late war she was an active member of the R.A.M.C. Comforts and Prisoners of War Fund. She was also of great assistance to the Committees on Tetanus and Trench Fever, and for her services received the O.B.E.

Bruce was ever ready to acknowledge how much he owed to her help and encouragement in his scientific work, and those who worked with him on the various commissions know well that he did not overstate the truth.